

جامعة الانبار
كلية العلوم
قسم التقنيات الأحيائية

اسم المادة: التقنيات الاحيائية
عنوان المحاضرة : Genetic engineering
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GENETIC ENGINEERING

The technology entailing all processes of altering the genetic material of a cell to make it capable of performing the desired functions, such as producing novel substances.

In other words:

Genetic engineering is the deliberate, controlled manipulation of genes in an organism in order to upgrade that organism

Facts about GE

- The result is called genetically modified organism(GMO)
- The Major aim is to produce much food at low cost to reduce the world hunger
- Thousands of new genetic engineered organisms will be set free into the environment by global life-science companies in the next century
- The new gene technologies enable creating life forms never existed before
- The agriculture focuses on developing herbicide-tolerant, pestresistant and virus-resistant plants in order to sell the seeds to farmers in the hope of increasing a company`s share of the seed and herbicide market

Pros & Cons of GE

Is GE precise enough ?

Pro arguments

- Scientits use „gene guns“ to insert the specific gene in the organism precisely

Contra arguments:

- The choice of gene is precise. But the insertion of this gene into a living cell is imprecise. There is no control where in the DNA the new gene is inserted. This process can disrupt the DNA

Is Genetic Engineering safety?

Pro arguments

- ❖ All genetically engineered foods have been thoroughly tested and demonstrated to be safe before they are released into the marketplace.
- ❖ Genetically engineered foods have been sold in the United States for several years and it is no evidence to indicate that these foods have harmed human health in any way.

Contra arguments:

- ❖ Tests are only conducted on animals like rats and mice. Apart from that the scientists are often not independent due to the fact that they are involved into the big companies
- ❖ The consequences are now unknown and unanticipated
- ❖ The consequences for the human health can only be assessed after human testing

Effects on the environment

Pro arguments:

- GE minimizes soil erosion by reducing the need of flowing .
- Plants resisant to weather , climate insect infestation, desease, molds and fungi.
- GE allows the creation of thousands of novel life forms in a brief moment.

Contra arguments:

- Every genetically engineered organism released into the environment is a threat to the ecosystem because they are unpredictable by interacting with other living things in the environment, therefore it is difficult to assess the threats of genetically engineered organisms to the ecosystem.
- GE can create toxins, noxious vegetation, harm to wild life and may create new molds and fungus.
- Once GMOs are released into the environment they cannot be recalled therefore they are a very dangerous kind of pollution.

Effects on warfare

Pro arguments:

- ✓ Biological weapons can determine a war.

Contra arguments:

- ✓ GE could be used to create biological weapons

Effects on the agriculture

Pro arguments:

- ✚ Farmers can spray in order to kill weeds without killing the crops.

Contra arguments:

- ✚ Furthermore the weeds might develop their spray resistance and greater herbicide resistance has to be created.
- ✚ The virus-resistance might also create new viruses that never existed before.

Pros & Cons in general

Pros

- Genetic engineering reduces costs of production, this means that the poor can afford more food
- Cheaper and safer source of human medicine
- Higher productivity
- GE can reduce the World hunger

Cons

- GE is unnatural
- GE crosses species barriers which would never occur in nature
- A high danger might be the “gene-flow”-transfer of genes from crops to weedy relatives by crosspollination
- There is also the fear of what will happen with biotech industry if the genetically engineered organisms cause a environmental catastrophe, which will be followed by costly damage to flora and fauna
- The healthiness of the humans is threatened by the genetically engineered food because it is not sure if there will be allergical reactions

References

- 1- John E. Smith(2010). Biotechnology, fifth edition. CAMBRIDGE UNIVERSITY PRESS.
- 2- Desmond S.T.Nicholl(2010). An introduction to genetic engineering . CAMBRIDGE UNIVERSITY PRESS.